

Meeting reports

Kenneth Keele Memorial meeting: Leonardo da Vinci

Keywords: Keele; Leonardo da Vinci

The large audience included members of the Leonardo da Vinci Society and the family of Kenneth Keele.

Kenneth Keele, the medical historian

E J Freeman *The Wellcome Institute for
the History of Medicine*

Keele had a long and creative association with the Wellcome Institute and library; he was Research Fellow 1970-1975 and, together with his great friend, F N L Poynter, he was at the centre of a small group of people who guided and influenced the study of the history of medicine in the decades of the 1950s and 1960s. Since Kenneth's death, Mary Keele has assembled his bibliography¹. Leaving out of his account his Leonardo work, clinical studies and book reviews, he wrote three books and some 23 articles on different aspects of medical history and also seven biographies of medical scientists in the book edited by T I Williams².

In *A short history of medicine*³ written in collaboration with Poynter he used Part 2 to illustrate the link between past history and the present practice of medicine, a theme to which he frequently returned. His monograph on William Harvey⁴ was followed swiftly by Walter Pagel's book on the same subject. These two books may be seen as one development of the way we now have to look at Harvey, 'To understand Harvey one must first see Aristotle as Harvey saw him' - this quotation summarizes Keele's point of view.

His most important and enduring book is *The evolution of clinical methods in medicine*⁵ - based on his Fitzpatrick Lectures at the Royal College of Physicians. It is important because it encapsulates his concept of medical history as an essential part of the history of our society and meriting a place in general education. For the medical profession, medical history is important in providing an essential link between ever-growing special techniques and vocabularies derived from biology, physics and information sciences. 'Medicine consists of the application of contemporary science to the problems of health and disease; wherever and whenever scientific knowledge varies, the clinical practice of medicine will vary also.' Respect for the past and a scholarly refusal to judge it by today's version of normality and truth was the hallmark of Keele's historiography and he was wholeheartedly at one with the professional historian's concern to study the past primarily on its own terms. His views on the usefulness of the historical method in the practice of medicine are summarized in a short paper in the *British Medical Journal* on 'Uses and abuses of medical history' (1966)⁶.

In so far as professional history becomes detached from current medicine it tends to lose the ordinary medical doctor as audience. We need more practical medical men like Kenneth Keele who take the

commitment so seriously that they command the respect of professional historians. There are signs that this is happening now that medical students in London have an opportunity for serious training in medical history.

Kenneth Keele's contribution to the study of Leonardo da Vinci

Professor Sir Ernst Gombrich OM CBE
The Warburg Institute

The catalogue of the library of the Warburg Institute lists 16 titles, extending from 1951 to 1980. Leonardo's heritage consists of some famous paintings, many almost equally famous drawings and thousands of scattered notes and observations on any number of topics. The interpretation of these notes will vary with the expectations. They could be interpreted as the random jottings of a self-taught enthusiast with a grasshopper mind, full of false starts, inconsistencies, elementary mistakes and utopian dreams. If you read Leonardo with such a prejudice in mind you cannot fail to find evidence for it: we only notice what we look for. Any interpretation proceeds by what has been called the 'hermeneutic circle': it must originate from an idea or assumption which subsequent reading will have to confirm or disprove. In Keele's studies we find the initial assumption that what the master wrote or drew must have made sense and that there is a meaning. Keele's conviction and reverence grew as his studies expanded.

Keele's first talk at the Royal Society of Medicine was entitled 'Leonardo da Vinci and the movement of the heart'⁷. A year later he addressed the Osler Club on 'Leonardo as a physiologist', and presented a lucid analysis of Leonardo's three lines of approach, the Galenic heritage, the analogy of macrocosm and microcosm and the mechanical model of the body which Leonardo postulated. In Keele's book on the subject⁸ he has this to say on the specific topic of the master's work on the heart and blood vessels: '... there can be no more doubt about its greatness than about its essential failure'. It is for the convincing demonstration of the former that one reads the book: it is impossible to understand Leonardo's thought and indeed his anatomical drawings without familiarity with the medical tradition of Galen, Avicenna and the 14th century handbook of dissection of Mondino. We come to understand and appreciate the final paragraph of this inspiring work: 'It is characteristic of Leonardo that he attempted winged flight before there were sources of power to use the resistance of the air. Perhaps it was inevitable that his mind, beating its powerful wings in the rarefied air of his age, should fail to find supporting forces and fall to earth in great and lonely failure.'

In 1952, the 500th anniversary of the Master's birth, Keele produced another paper on 'Leonardo's medical and biological illustrations'. Seven years later in the 'Genesis of Mona Lisa' he suggested that the lady must be pregnant and supported the interpretation of the landscape background as symbolic of the genesis of man and his mother earth. He held on to this poetic interpretation but did not labour it in his later writings.

Based on
meeting of
Section of the
History of
Medicine,
7 December 1988

What Keele saw as the real aim of his studies he expressed most succinctly in the *Short history of medicine* which he published jointly with Noel Poynter³. 'Perhaps the most valuable legacy of all would be to decipher the pattern of the mind which Leonardo has left us in the rich profusion of the notebooks.' All Keele's future studies were directed towards this aim. He demonstrated the echoes in the early coitus figures of a passage in Plato's 'Timaeus'⁹ and he urged the importance of reading Leonardo's notes in their chronological sequence.

But while Leonardo's art was appreciated by his contemporaries his science was not. In 'Leonardo's influence on Renaissance anatomy'¹⁰ Keele wrote

that his '... tentative gropings towards mechanical solutions of cosmic and human problems must have appeared not only incomprehensible but, if penetrated, outrageous'. In his lecture for the Congress on Leonardo's Legacy held in Los Angeles in 1966 he demonstrated the cohesion of Leonardo's interpretation of sensory perception, conceived entirely in mechanical terms of motion and percussion. The senses were seen as receptor organs which react to the impact of incoming stimuli carried by rays or waves. The senses respond directly and predictably to the stimuli of the external world and must faithfully reveal to us the structure of that world. Nature does not deceive the scientist or the artist who

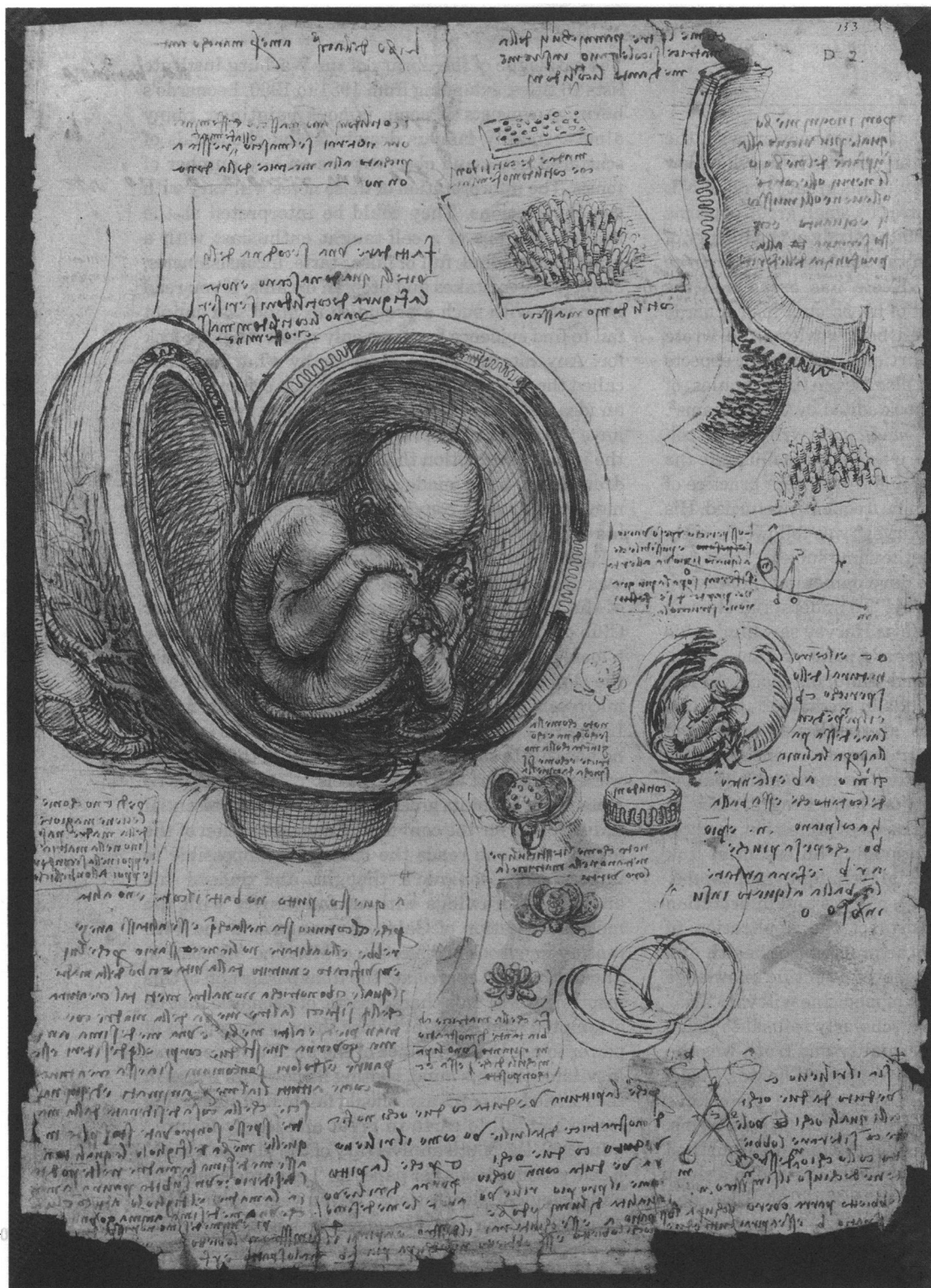


Figure 1. The infant in the womb (Windsor Castle, Royal Library, ©1988 Her Majesty The Queen)

relies on sense perception. This confidence in the senses which he acquired early in life inspired him also to experimental observations which form the subject of three of Keele's subsequent observations: the flow of water to elucidate the flow of blood in the aortic valve, the study of the alimentary tract and his view on the causes of arteriosclerosis. In 1978 he gave the inaugural Fulton Lecture at Yale¹¹ and showed how his approach gave insights into Leonardo's 'unique artistic and scientific mind'.

Who but Keele could be called in to describe and

explain that astounding treasure, Leonardo's corpus on anatomical drawings at Windsor Castle? He joined Carlo Pedretti in the labour of the new edition¹². One of the significant innovations is the chronological arrangement which enables the user to gain a grasp of Leonardo's intellectual developments. After that Herculean task he turned to the demanding work of synthesis. He presented the essence of his views at the Milan Congress of 1982, and at last crowned his life's work with the volume on 'Leonardo's elements of the science of man'¹³, in which he emphasized that

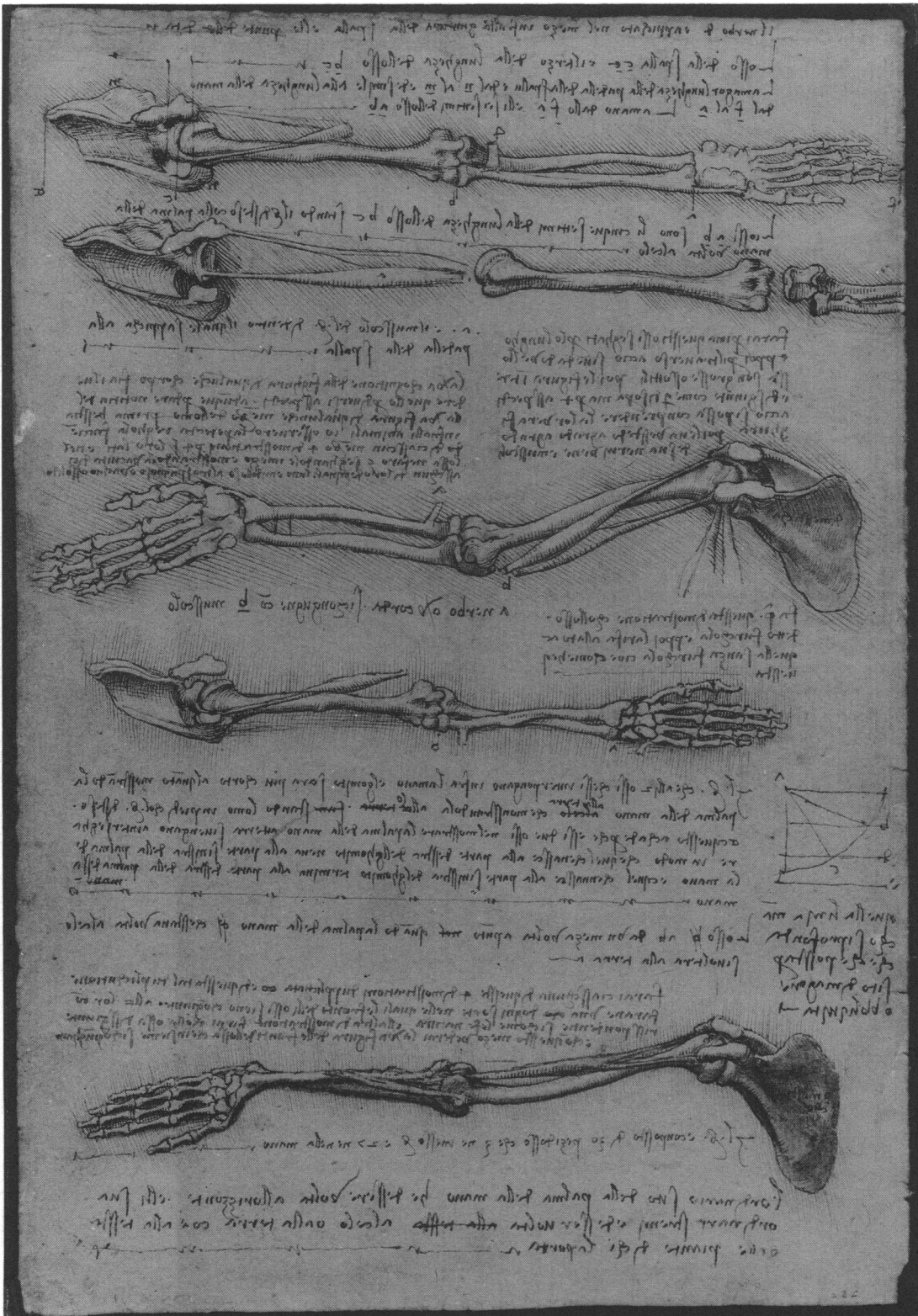


Figure 2. The movements made by the biceps. The bicep supinates the forearm and flexes the elbow. The script has been deciphered by Kenneth Keele. Leonardo was left handed, and wrote in mirror image, right to left, in Italian. (Windsor Castle, Royal Library. ©1988 Her Majesty The Queen)

Leonardo applied what he called the 'pyramidal law' of geometrical relationships (derived from the study of perspective) to the laws of movement, force, weight and percussion. His inaugural lecture to the Leonardo da Vinci Society was on 'Leonardo and food'. He eagerly supported Kim Veltman's monumental study of Leonardo's perspective¹⁴ as the palpable link between his science and his art. The coming Leonardo Exhibition at the Hayward Gallery (1989) will also stand as a monument and a memorial to Kenneth Keele.

Kenneth Keele and the Windsor Leonardos

The Hon Mrs Roberts *The Royal Library,
Windsor Castle*

Keele's association dated back to the 1940s when he was given access to the collection by the then Royal Librarian, Sir Owen Morshead. The proximity to

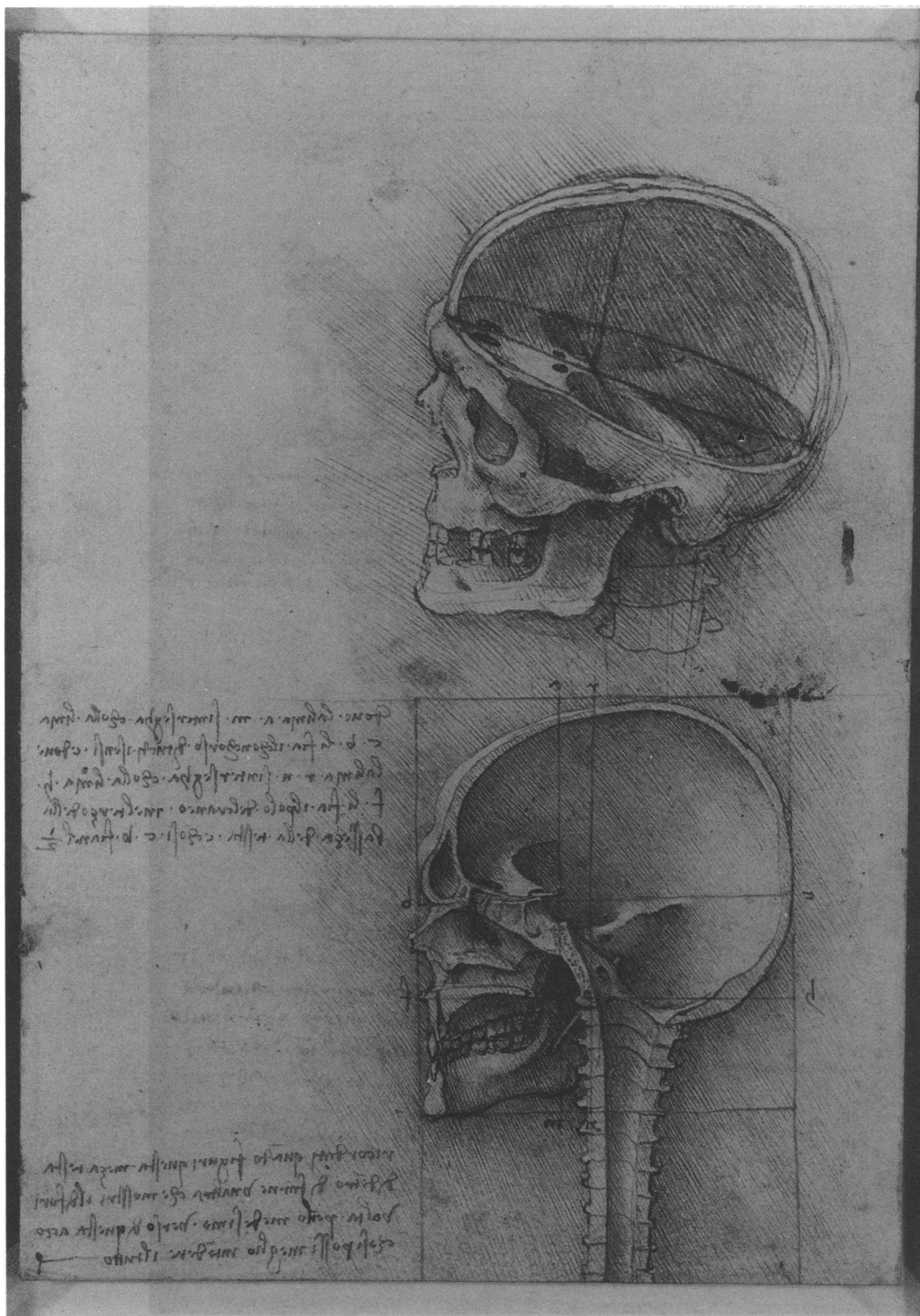


Figure 3. Two views of the skull (Windsor Castle, Royal Library. ©1988 Her Majesty The Queen)

Windsor of the Keele's home near Staines was particularly fortunate, as was the fact that Kenneth's interest in these drawings coincided with the moment at which (through advanced photographic and reproductive methods, and improved techniques in paper conservation) the anatomical drawings were made available to a wider public.

The 600 drawings by Leonardo in the Royal Collection were first gathered together in a single volume by the Italian sculptor Pompeo Leoni, c. 1600. The volume appears to have entered the British Royal Collection during the reign of Charles I (or possibly by Charles II). Leonardo's 200 anatomical drawings (which with one or two exceptions are all in the Royal Collection) were pasted into the pages first of this volume and later of volumes of more recent manufacture until (from 1970) they were removed and mounted individually. In their rigid mounts they can now be exhibited and photographed without undue risk.

From the late 1940s until his death, Kenneth worked intermittently on the Windsor Leonardos, both in continuance of his own researches and in connection with the various projects involving these drawings. He contributed explanatory texts concerning the anatomical studies (shown 'at open book' or in photographic reproduction) included in the Royal Academy exhibition in 1952 and at The Queen's Gallery exhibition in 1969-1970. He was also generous in his assistance with small private displays of the drawings at Windsor, and in replying to specific queries from the Royal Library. From 1974 until publication in 1980-1981 Kenneth was involved in painstaking research and examination of the original drawings for his seminal study¹² (jointly with Carlo Pedretti), published by the Johnson Reprint Corporation in New York but printed by the Curwen Press in Plaistow, East London. The speaker, who has worked at Windsor since 1975, recalled many happy discussions with Kenneth in connection with that project.

The talk ended with the showing of a small selection of colour slides of Leonardo's anatomical drawings, while Kenneth's (and Leonardo's) words about those specific drawings were read aloud (Figures 1-3).

Kenneth Keele the physician and the man

Dr A Sakula MD FRCP *President, Section of the History of Medicine*

Born in 1909 in London into a medical family, Kenneth Keele was one of three sons who entered medicine. His brother was a general practitioner, and another, Cyril, was Professor of Pharmacology at the Middlesex Hospital. Kenneth went to Epsom College, won a scholarship to St Bartholomew's Hospital, where he was student president of the Abernethy Society: he won the William Harvey Prize in physiology and qualified in 1932. His great interest was cardiology and he became clinical assistant to Sir John Parkinson at the National Heart Hospital. He obtained staff appointments at several hospitals and set himself up in practice in Harley Street. In 1939 he was appointed consultant physician in the

Emergency Medical Service at St Bartholomew's Hospital which had been evacuated to St Albans. In 1941 a terrible tragedy befell him when his first wife died from infarction of the suprarenal gland during pregnancy and he subsequently wrote a classic medical paper on this subject. In 1942 he joined the RAMC and spent the next four years as a medical specialist mainly in India where he worked on tropical sprue in the company of Douglas Black and others. After the war he was appointed consultant physician to Ashford Hospital near Staines and this facilitated his subsequent researches at Windsor. His main clinical interest was still cardiology and, in 1948, he was the first to apply the new technique of angiocardiology to the diagnosis of congenital heart disease. He also worked with his brother, Cyril, on the study and quantitative evaluation of pain and published many clinical papers and other studies¹⁶.

This was a backcloth to his growing passion for medical history and, in particular, Leonardo da Vinci. He became internationally famous for this work: he gave the Fitzpatrick lectures at the Royal College of Physicians and he was President of the Section of the History of Medicine of the RSM (1960-1962). At the Society of Apothecaries he lectured in the Diploma Course and delivered the Osler and the Sydenham Lectures. He gave other eponymous lectures around the world, the Guthrie at Edinburgh, the Cohen at Liverpool, and in the USA, where he was visiting professor at UCLA and later at Yale, he gave the Beaumont and the inaugural John Fulton lectures. Those who knew him regarded him as a charming and friendly but a very modest person, interested in the arts and music, with a remarkable sense of humour. He grew old gracefully, with quiet wisdom, and died suddenly in 1987 at the age of 78, having seen the creation of his brain-child the Leonardo da Vinci Society of which he was the first president and which has honoured him by the Kenneth Keele Memorial Fund which is to assist young Leonardo scholars and students in their studies and travels. To have known him and to have been a friend of his was a very rare privilege.

Acknowledgment: Photographs of items in the Royal Collection (Figures 1, 2 and 3) are reproduced by gracious permission of Her Majesty The Queen.

R Creese

*Honorary Secretary
Section of the History of Medicine*

References

- 1 Keele M. *Bibliography of Kenneth David Keele* (typescript). A copy is held at the Library of the Wellcome Institute for the History of Medicine, London
- 2 Williams TI ed. *A biographical dictionary of scientists* London: Black, 1969
- 3 Keele KD, Poynter FNL. *A short history of medicine*. London: Mills & Boon, 1961
- 4 Keele KD. *William Harvey: the man, the physician and the scientist*. London: Nelson, 1965
- 5 Keele KD. *The evolution of clinical methods in medicine*. London: Pitman, 1963
- 6 Keele KD. Uses and abuses of medical history. *Br Med J* 1966;ii:1251-4
- 7 Keele KD. Leonardo da Vinci and the movement of the heart. *Proc R Soc Med* 1951;44:209-13
- 8 Keele KD. *Leonardo da Vinci on movement of the heart and blood*. London: Harvey and Blythe, 1952
- 9 Keele KD. *Anatomies of pain*. Oxford: Blackwell, 1957

- 10 Keele KD. Leonardo da Vinci's influence on Renaissance anatomy. *Medical History* 1964;8:360-70
- 11 Keele KD. Leonardo's anatomia naturale. *Yale J Biol Med* 1979;52:363-409
- 12 Keele KD, Pedretti C. *Leonardo da Vinci: Corpus of the anatomical studies in the collection of Her Majesty The Queen at Windsor Castle*, volumes 1, 2 and 3. London: Johnson Reprint 1978-1980
- 13 Keele KD. *Leonardo da Vinci's Elements of the science of man*. New York: Academic Press 1983
- 14 Veltman KH. *Linear perspective and the visual dimension of science and art*. Munchen: Deutscher Kunstverlag, 1986
- 15 Keele KD. *Leonardo da Vinci and the art of science*. Hove: Weyland, 1977
- 16 Keele KD, Matheson NM. *Intra abdominal crises*. London: Butterworth, 1961

(Accepted 25 May 1989)

Funding of high technology medicine

Keywords: technology; funding; evaluation

Opening the scientific part of the meeting from the chair, **Dr Robert Maxwell** made it clear that high technology medicine encompasses far more than the provision of machinery, 'technology' meaning what it says. Later in the evening it became clear that a shorthand way of defining the term is 'expensive, large in its own right and widespread in its use'. Its funding is a source of anxiety to rich and poor, for no one quite knows how to manage it. Although both speakers and several of the questioners from the floor focused to some extent on actual expenditure, the bulk of the evening was taken up with the more complex topic of how and when to evaluate health care systems.

Barbara Stocking (Director of Health Services Development, King's Fund), gave an overview of the problem, concentrating on the EC and the United States. She spelt out how broad the topic is: equipment and drugs should be included within high tech medicine; evaluation of its value has to include both social and economic issues. In vitro fertilization was given as an example of something requiring sophisticated measures.

One of the major characteristics of assessments in this field is the need to have information well in advance. Holland was quoted as a country that has gone a long way down the road of picturing future scenarios. Questions have to be asked about the extent to which machinery works, how effective it is clinically and what the economic and social implications are. There is a need also to synthesize and to disseminate the information gleaned. Scandinavian countries, France and Greece all have a good record in aspects of evaluation but none has all the answers.

A major question, irrespective of the details of what is being evaluated, is when to assess, for machinery changes all the time. It is not always clear whose responsibility it is to evaluate, nor is it immediately obvious which aspects of the system have to be looked at.

Such is the complexity of evaluation in this area that the USA has an Office of Technology Assessment. Several hundred people are involved in assessment and they have so much material that they have had to develop a directory to cope with it.

Evaluation is, however, only part of the picture. Having evaluated one then has to do something in response to the results. Technology control can be exercised at two levels, the first being planned at regional or national levels, with the second being the imposition of financial constraints. Budgetary systems, as used in Denmark, Sweden and the UK send money down, with decisions on what is to be bought being made at local levels. This approach is to be compared with the insurance control system whereby decisions are made at the top.

Ms Stocking concluded by echoing the spirit of the words of Dr Maxwell: there is no right answer, we need a greater commitment to the need to evaluate.

The next speaker was **Michael Bos** (Head of the Section for the Planning of Advanced Medical Care, Dutch Ministry of Health). Technology is the answer, he began, but what is the question? In order to set his points in context he gave a brief introduction to the Dutch health care system which is essentially one of insurance funds within a social security framework. There are compulsory insurance contributions from employers and employees and a national insurance scheme to cover excessive care costs. There is no private health care system and no free practising specialists outside hospitals. Each hospital has its own budget, negotiating directly with insurance agencies. Capital investment in hospitals comes from the capital market, ie from banks. 9.1% of the gross national product is spent on health care, with high tech medicine taking up about 10% of hospital costs and about 2% of the overall health care costs.

The regulation of medical technology came to Holland in a major way in 1985. There is now a framework of quality control with the assumption that the evaluation of new procedures has to be undertaken before reimbursement for them takes place. Evaluation is not geared solely to reducing overall expenditure: more generous budgets are given to those who introduce technology appropriately. The policy for 1988-1989 is to increase spending in this area, with the aim of providing more treatment for

Based on meeting of Open Section, 17 April 1989